

EXAMINATION AND SURVEY OF BUTTERMILK CHANNEL,
NEW YORK HARBOR.

COLUMBIA LIBRARIES OFFSITE
EVERY FINE ARTS RESTRICTED



AR01500430

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF
EXAMINATION AND SURVEY OF BUTTERMILK CHANNEL, NEW
YORK HARBOR.

DECEMBER 6, 1900.—Referred to the Committee on Rivers and Harbors, and ordered
to be printed.

PROPERTY OF
UNITED STATES SENATE
LIBRARY

WAR DEPARTMENT,
Washington, December 4, 1900.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated December 1, instant, together with reports of Maj. W. L. Marshall, Corps of Engineers, dated June 25 and November 28, 1900, of a preliminary examination and survey, respectively, of Buttermilk Channel, New York Harbor, made in compliance with the emergency river and harbor act of June 6, 1900.

Very respectfully,

ELIHU ROOT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, December 1, 1900.

SIR: I have the honor to submit the accompanying Labf reports, dated respectively June 25 and November 28, 1900, with maps by Maj. W. L. Marshall, Corps of Engineers, upon preliminary examination and survey, made to comply with the provisions of the emergency river and harbor act of June 6, 1900, of Buttermilk Channel, New York Harbor, with a view to obtaining a channel of the full width
Washington.

and depth as that contemplated by the project adopted for Bay Ridge and Red Hook channels.

The project for Bay Ridge and Red Hook channels contemplates securing a depth of 40 feet at mean low water, with width of 1,200 feet, these dimensions having been adopted by the terms of the river and harbor act of March 3, 1899.

Major Marshall is of opinion that a channel of very nearly, if not quite, the dimensions specified by the act of 1900 can be made without the expense of rock excavation, and the estimate presented contemplates the excavation of a channel of the required dimensions, so far as it can be done without requiring the removal of rock in place or of boulders of over 5 cubic yards volume, which can not readily be handled by the usual class of dredges. The cost of the dredging work is estimated at \$1,900,000. The local officer states in this connection that the question of removing rock in place or boulders of over 5 cubic yards volume should be considered in any contract that may be made on the basis of the estimate furnished, leaving the removal of such rock and boulders to be provided for when their presence can be determined and, if found, their quantity estimated.

In his report on preliminary examination Major Marshall expressed the opinion that the proposed increase in the dimensions of Buttermilk Channel would be an advisable work for the United States to undertake.

Very respectfully, your obedient servant.

JOHN M. WILSON,
Brig. Gen., Chief of Engineers,
U. S. Army.

Hon. ELIHU ROOT,
Secretary of War.

PRELIMINARY EXAMINATION OF BUTTERMILK CHANNEL, NEW YORK HARBOR, NEW YORK, WITH A VIEW TO OBTAINING A CHANNEL 40 FEET DEEP AT MEAN LOW WATER AND 1,200 FEET WIDE.

UNITED STATES ENGINEER OFFICE,
New York City, June 25, 1900.

GENERAL: I have the honor to submit the following report upon a preliminary examination of "Buttermilk Channel, New York Harbor, with a view to obtaining a channel of the same width and depth as those contemplated by the project adopted for Bay Ridge and Red Hook channels," made under the provisions of act of Congress approved June 6, 1900.

The project adopted for Bay Ridge and Red Hook channels, under authority of the river and harbor act of 1899, contemplates a width of 1,200 feet and a depth of 40 feet at mean low water, and these are the dimensions in view in this examination.

Buttermilk Channel is the southeasterly one of two channels connecting the East River with the main channel of New York Harbor. It extends along the Brooklyn water front southwesterly to Red Hook, where it meets the Red Hook Channel, and continues to the main harbor channel. The extreme length of Buttermilk Channel from the 40-foot curve in East River to the 40-foot curve in the main channel is 2½ miles. Throughout this length the channel had a natural depth of

about 26 feet at mean low water, but the deep waterway was crooked, in many places narrow, and on account of the rapid current it was very difficult to follow. Improvements made under different projects adopted and completed since 1880 have resulted in making the 26-foot channel 1,000 feet wide.

Under provision of the river and harbor act of 1896, a survey was made, with a view to deepening Bay Ridge, Red Hook, and Buttermilk channels, so as to make one continuous channel 30 feet deep at mean low water and 1,000 feet wide, with an alternative proposition for depths of 35 feet and widths of 1,200 feet. The report on this survey was printed in the annual report of the Chief of Engineers for 1897, page 1178.

The piers and landings along Buttermilk Channel are points for receiving, storing, and shipping large quantities of freight, grain, South American, Carribean, Mediterranean, and miscellaneous goods. The freight terminal of the Ward Line, the Prince Line, the Anchor Line, the Lamport & Holt Line, are on this channel.

The commerce of Buttermilk Channel consists of widely varying classes of goods, including large amounts of sugar and coffee, cotton, and other articles received and shipped to South American, Carribean, and Mediterranean ports.

For the calendar year 1899 a fairly accurate statement of freights received has been obtained; no records of freights shipped are procurable; in previous years the shipments have exceeded the receipts by an average of about 10 per cent, and the same ratio may be assumed for 1899.

Commercial statistics for the calendar year 1899.

	Tons.	Estimated value
Receipts	5,857,292	\$177,978,512
Shipments (estimated)	6,161,000	125,776,000
Total	12,018,292	373,754,512

Vessels arriving and departing (1899).

	No.	Draft.	Tonnage.
		<i>Feet.</i>	<i>Tons.</i>
Steamers	1,216	18-29	1,000-6,800
Sail	507	12-26	500-3,000
Barges, etc.	31,390	(1)	(1)
Total	33,113		

¹ No record.

The above statement is for cargoes and vessels at the several piers and landings. There is no means of making even an approximate estimate of the amount of freight which passes through this channel without touching at the landings.

In my opinion the improvement of Buttermilk Channel, with a view to obtaining a channel of the same width and depth as those contemplated by the project adopted for Bay Ridge and Red Hook channels, would be an advisable work to be undertaken by the United States, both on account of the very large amount of commerce carried on in this channel and because until it is so improved the projected improvement of Bay Ridge and Red Hook channels will be of local use only,

their availability as an entrance to East River being limited by the depth obtained in Buttermilk Channel.

A survey of the channel, consisting principally of borings, will be necessary to determine the character of material existing down to the depth of 40 feet below mean low water. Nearly all the other data required can be obtained from previous surveys. It is impracticable, at any reasonable cost, to obtain complete information as to the character of material, and particularly as to the presence of rock, in a proposed channel of 40 feet depth and of great length and width. The survey contemplated would determine the kind of material at certain selected points, from which the general kind of material may be, with a fair degree of probability, inferred. A survey sufficient for this purpose is estimated to cost \$3,000. There is a balance of funds remaining from prior appropriations available for work in Buttermilk Channel which will be sufficient for making this survey.

Very respectfully, your obedient servant,

W. L. MARSHALL,
Major, Corps of Engineers.

Brig. Gen. JOHN M. WILSON,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First Indorsement.]

NORTHEAST DIVISION ENGINEER OFFICE,
New York, June 25, 1900.

Respectfully forwarded to the Chief of Engineers, with recommendation that the survey be authorized at the estimated cost of \$3,000, the expenses to be defrayed from existing balances, which are ample for the purpose.

G. L. GULESTIE,
Colonel, Corps of Engineers,
Division Engineer.

[Second Indorsement.]

OFFICE CHIEF OF ENGINEERS,
U. S. ARMY,
June 30, 1900.

Respectfully submitted to the Secretary of War.

Under the provisions of the emergency river and harbor act approved June 6, 1900, a preliminary examination has been made of Buttermilk Channel, New York Harbor (full text of item quoted within).

The locality is reported to be worthy of improvement, and I recommend that a survey be made and the cost of the improvement be estimated, the expenses of the survey to be paid from balance of former appropriations available for improving Buttermilk Channel.

JOHN M. WILSON,
Brig. Gen., Chief of Engineers,
U. S. Army.

[Third Indorsement.]

WAR DEPARTMENT,
July 2, 1900.

Approved as recommended by the Chief of Engineers.
By order of the Secretary of War:

JOHN C. STOFFIELD,
Chief Clerk.

SURVEY OF BUTTERMILK CHANNEL, NEW YORK HARBOR, NEW YORK,
WITH A VIEW TO OBTAINING A CHANNEL 40 FEET DEEP AT MEAN
LOW WATER AND 1,200 FEET WIDE.

UNITED STATES ENGINEER OFFICE,
New York City, November 28, 1900.

GENERAL: I have the honor to submit the following report upon the survey of Buttermilk Channel, New York Harbor, made under authority of the Secretary of War, dated July 2, 1900, and pursuant to the provisions of the river and harbor act of 1900. This act authorized a survey of the channel with "a view to obtaining a channel of the same width and depth as those contemplated by the project adopted for Bay Ridge and Red Hook channels." This means a depth of 40 feet at mean low water with width of 1,200 feet, the dimensions for Bay Ridge and Red Hook channels specified in the river and harbor act of 1890.

Herewith is transmitted a map showing accurately the present depths in Buttermilk Channel and the location for the proposed channel of 40 feet depth and 1,200 feet width, and a supplementary chart showing the character of material ascertained by borings.

The borings were made with water jet throughout the proposed channel to ascertain the kind of material below the bottom. In the upper part of the channel it was found to be rather harder below the bottom than at the bottom, and the bank of boulders along the Governors Island shore is somewhat more extended than had been anticipated. In the lower (south) part of the channel the material is soft to and beyond the depth of 40 feet. It is not expected that rock in place will be encountered within the limits of the proposed channel, but this can not be positively asserted because after considerable depth of penetration it is not possible by any method short of actual excavation to distinguish between ledge rock and boulders. In any case, it is believed that a channel of very nearly, if not quite, the projected dimensions can be made without the expense of rock excavation. The estimate herewith contemplates the excavation of a channel of the full proposed dimensions so far as it can be done without requiring removal of rock in place, or of boulders of over 5 cubic yards volume, which can not readily be handled by the usual class of dredges. This should be considered in any contract which may be made on the basis of this estimate, leaving the removal of rock in place and larger boulders to be provided for when their presence can be determined and, if found, their quantity estimated.

The estimate of cost of excavating this channel is as follows:

Dredging 4,883,000 cubic yards of material, scow measurement, at average cost of 26 cents per cubic yard.....	\$1,791,140
Estimated cost of supervision and contingent expenses, about 6 per cent.....	108,860
Total estimated cost	1,900,000

The survey was made under the supervision of Mr. Henry N. Babcock, assistant engineer, whose report, transmitted herewith, contains further details of the work.

Very respectfully, your obedient servant,

W. L. MARSHALL,
Major, Corps of Engineers.

Brig. Gen. JOHN M. WILSON,
Chief of Engineers, U. S. A.

REPORT OF MR. HENRY N. BARCOCK, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
New York City, November 24, 1900.

MAJOR: I have the honor to submit the following report upon the survey of Buttermilk Channel, New York Harbor, with reference to excavating it to a depth of 40 feet at mean low water, with width of 1,200 feet.

The survey was begun in August and completed in October, 1900; the accompanying map, scale 400 feet to the inch, shows the present condition of Buttermilk Channel and the best location for a deep channel of the dimensions proposed.

The total length of such a channel is about 14,000 feet, extending from the 40-foot curve in East River, near the Wall Street Ferry crossing, to the 40-foot curve in the main channel, about $1\frac{1}{2}$ miles below the south end of Governors Island.

In addition to the soundings, borings were taken to determine the character of material to be excavated. The total number of locations of borings was 2,023; they were distributed most thickly in the upper part of the channel opposite Dimmock and Coenties reefs, where the presence of ledge rock was most suspected. The borings were made with a water jet, using a Worthington pump 74 by 5 by 6 inch stroke, with 3-inch discharge reduced to 1 inch at the nozzle. The pump was mounted on the U. S. S. *Manitree*, and her derrick was used for handling the pipe, which for the length required weighed about 250 pounds. The steam pressure at the boiler averaged about 135 pounds; the water pressure at the pump discharge at its maximum was 125 pounds, but where the bottom was moderately soft the pressure was cut down. This apparatus worked rapidly in mud, sand, and gravel, and slowly in clay if not very stiff; where boulders were thick, it could be sunk around and between them to a penetration of 8 to 15 feet; but below that depth it could not be depended upon. Turning aside from the stone, the pipe would run down obliquely, getting wedged between or abutting against boulders, and repeated trials in the same vicinity would give the same result at varying depths. The weakest part of the outfit was the couplings which join together the sections of pipe; no couplings could be found in the market which would stand the strain on a pipe 45 feet long. Special couplings made to order of mild steel and 6 to 8 inches long would have proven economical in the end.

The character of material to be removed is as follows:

In the upper part of the channel, above Red Hook, on the east side, sand and gravel to depths of 28 to 35 feet; below that, clay, and in front of Atlantic Avenue, a small reef, probably hardpan; in mid-channel, sand and gravel, with occasional boulders; in the eddy, where the East River and Buttermilk tides meet, the sand is rather soft for a depth of 3 to 5 feet; on the west side, above Governors Island, is similar sand and gravel and occasional boulders. This is the section where ledge rock is apparently most liable to occur, and in several points the pipe could not be driven to 40 feet depth, but such points are more or less separated, and it seems probable that they indicate boulders rather than several peaks of ledge under the sand. Along the Governors Island shore the bank is full of boulders, and could not be penetrated to the required depth; there is no reason for suspecting rock in place.

South of Red Hook the bottom is sand or mud, generally quite soft and nowhere hard.

ESTIMATE OF AMOUNT OF EXCAVATION AND COST.

In estimating the amount of material to be removed in order to make a channel of the proposed depth and width, it is assumed that the banks of the channel will stand at a slope of 1 upon 4, that the unavoidable irregularities of bottom will be equivalent to 1 foot additional depth, and that the material will measure 25 per cent more in scows than in place.

	Cubic yards.
Total excavation in place for channel of even depth of 40 feet, mean low water, and 1,200 feet wide, with side slopes of $1\frac{1}{4}$	4, 948, 000
Add for irregular bottom, equivalent to 1 foot additional depth.....	563, 000
Total yardage in place.....	5, 511, 000
Increase of bulk in scows, 25 per cent.....	1, 378, 000
Total excavation, measured in scows.....	6, 889, 000

Of this amount 1,890,000 cubic yards in place, equivalent to 2,360,000 yards in scows, or about one-third of the whole, may be classed as hard dredging, containing considerable amounts of clay and boulders, the other two-thirds being classed as comparatively easy of excavation. The demarcation between the two classes of material is of course not sharply defined, and the proportion is an estimated one.

There is no dredging plant already built in this vicinity which is capable of dredging to 40 feet depth with economy and of completing a work of this amount within a reasonable period, say four years. If the entire work were authorized under a single continuing contract, so that bidders would be warranted in planning to build a new plant, or to alter or enlarge existing plants, a fair estimate of cost per yard, scow measurement, would be 18 cents for two-thirds of the work and 42 cents for the remaining third, being an average of 26 cents per yard for the entire work. It would be much higher than the rates obtained for Bay Ridge and Red Hook channels, both on account of the character of the material and the stronger tidal current. An offer might be made at lower price than 26 cents per yard particularly if experience shows that the Bay Ridge contract is a profitable one for the contractors. It is believed, however, that under present conditions the price mentioned is a fair estimate of probable cost.

6,881,000 cubic yards, at 26 cents per yard, measured in scows.....	\$1,791,460
Supervision and contingent expenses, about 6 per cent	108,860

Total	1,900,320
-------------	-----------

The survey was made by a party under immediate charge of Mr. Glen E. Balch, surveyor.

Very respectfully, your obedient servant,

HENRY N. BADENCK,
Assistant Engineer.

Maj. W. L. MARSHALL,
Corps of Engineers, U. S. A.

O

AVERY ARCHITECTURAL AND FINE ARTS LIBRARY

GIFT OF SEYMOUR B. DURNI OLD YORK LIBRARY



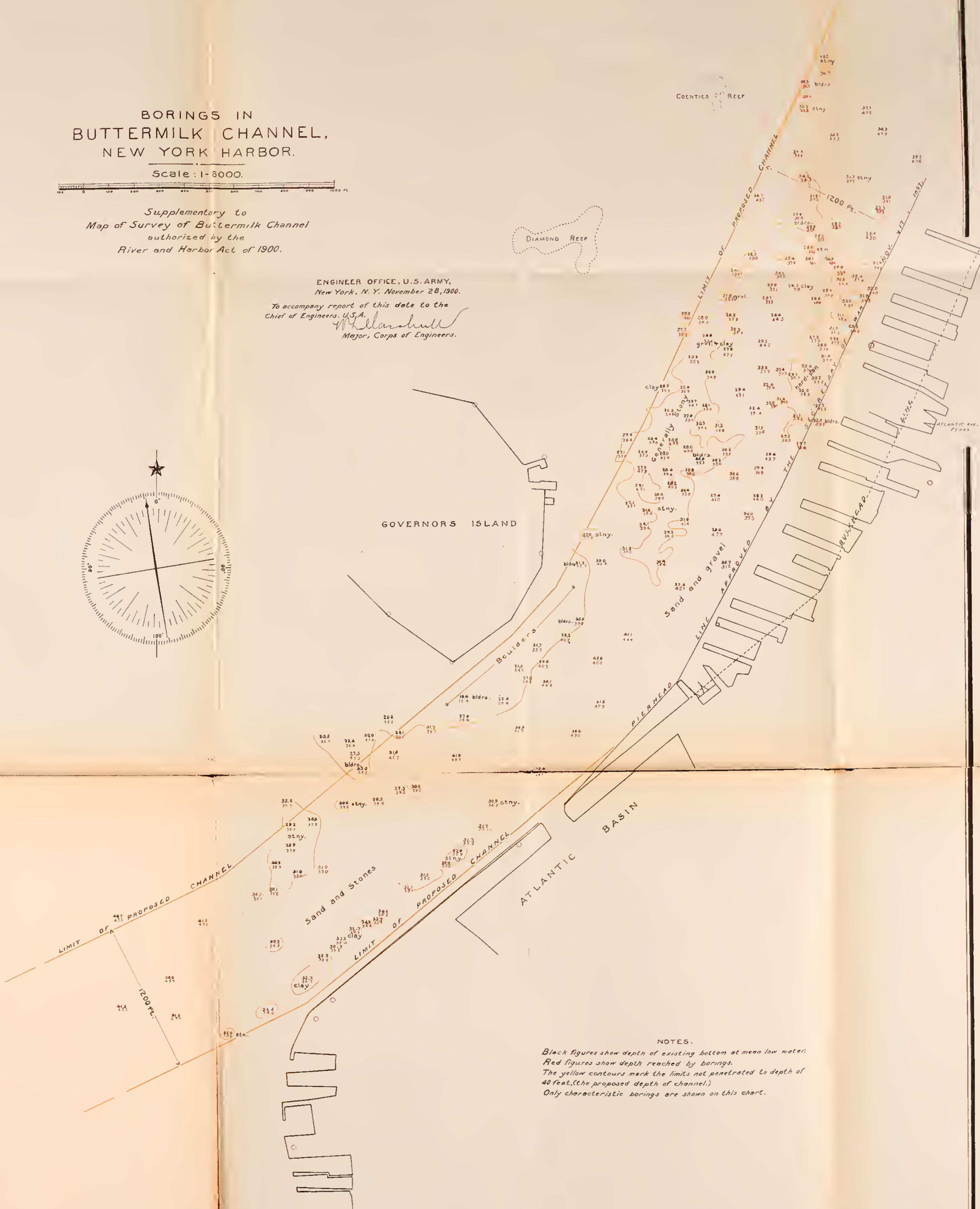
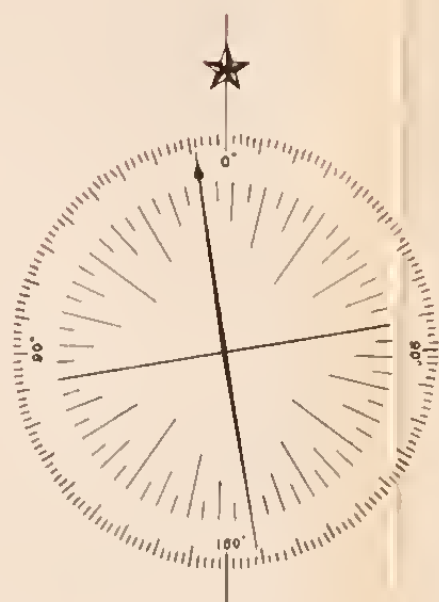
Scale: 1-6000.

ENGINEER OFFICE, U.S. ARMY,
New York, N. Y. November 28, 1900.

To accompany report of this date to the
Chief of Engineers. U.S.A.

To accompany report of this date to the
Chief of Engineers, U.S.A.

William H. H. H. H.
Major, Corps of Engineers.



NOTES.

Black figures show depth of existing bottom at mean low water.
Red figures show depth reached by borings.
The yellow contours mark the limits not penetrated to depth of 40 feet, (the proposed depth of channel.)
Only characteristic borings are shown on this chart.



NEW YORK
CITY



RIVER
COUNTIES REEF

EAST

NOTES.

Soundings are expressed in feet and tenths and referred to the plane of mean low water determined by U. S. Coast Survey at Governors Island

Bench Mark on retaining wall in front of Headquarters, Governors Island, marked U.S.C.S., elevation above plane of mean low water, 14.24 feet.

The 30-foot curve is shown thus

Mean rise and fall of Tides

The PROPOSED CHANNEL, 1200 feet wide and 40 feet deep at mean low water is outlined in heavy yellow lines.

GOVERNORS ISLAND

ATLANTIC

BASIC

CIAL

ST. JERONA

ST. OS

RICHARD

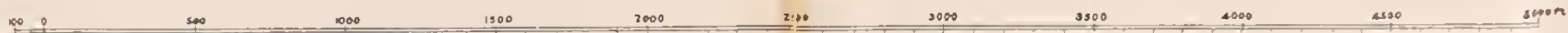


1900
SURVEY OF
BUTTERMILK CHANNEL, NEW YORK HARBOR.

WITH REFERENCE TO A CHANNEL 40 FEET DEEP AT
MEAN LOW WATER AND 1200 FEET WIDE.

AUTHORIZED
BY THE RIVER AND HARBOR ACT OF 1900
and made under direction of
MAJOR W.L. MARSHALL, CORPS OF ENGINEERS, U.S.A.
by party in charge of
H.N. BABCOCK, ASST. ENGR.; G.E. BALCH, SURVEYOR,
H.S. ANDREW AND R.P. MURDEN, DRAFTSMEN.

SCALE: 6000.



ENGINEER OFFICE, U.S. ARMY,
New York, N.Y., November 28, 1900.
To accompany report of this date to the
Chief of Engineers, U.S.A.
W.L. Marshall
Major, Corps of Engineers.

